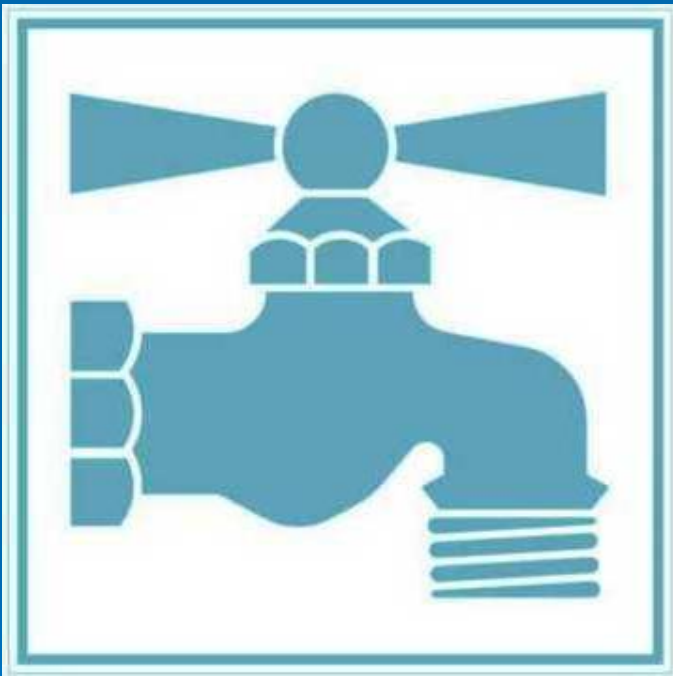


Kane County Water Supply Planning



Presented to
Village of Big Rock
Comprehensive
Planning Process

Paul M. Schuch, P.E., Director
Water Resources Division

May 13, 2013

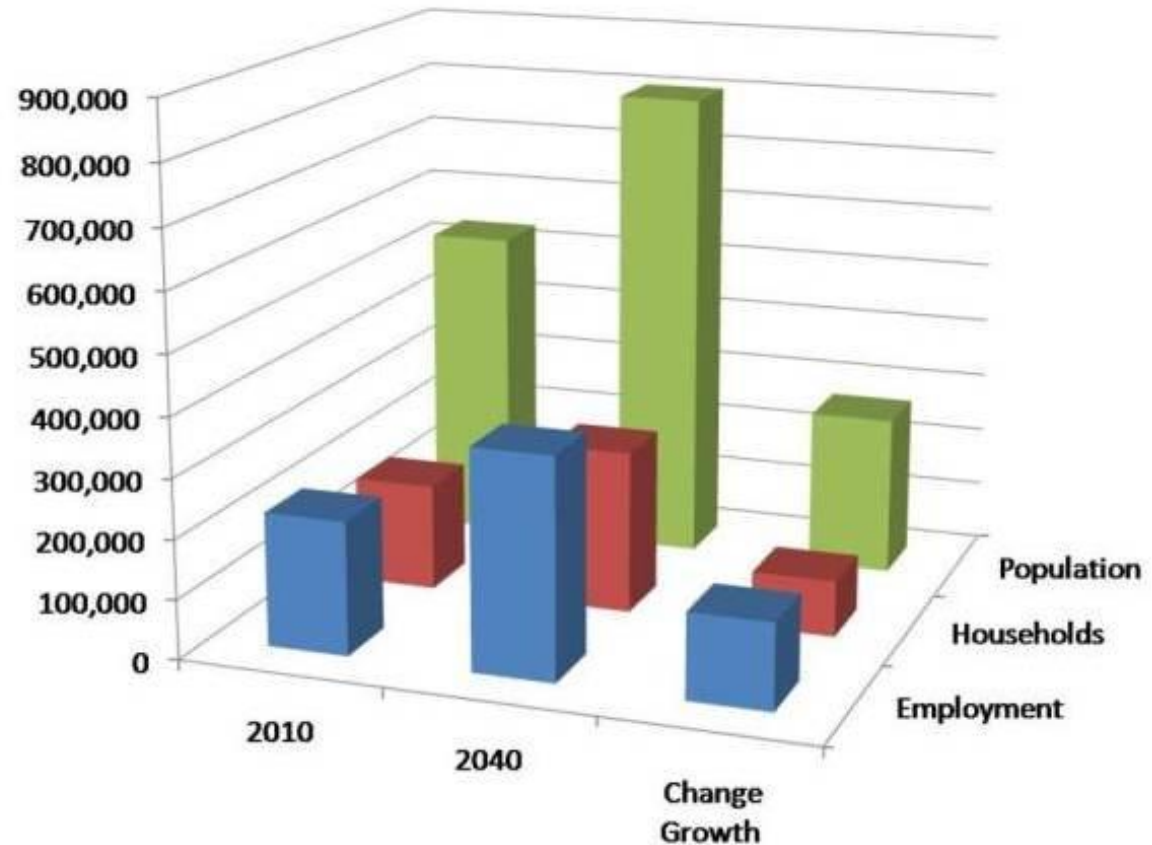
Kane County Growth 2010 – 2040

Population –
51%

Housing –
53%

Employment –
64%

**Population, Households, and Employment
for Kane County, IL**



Population, Households, and Employment, Kane County, IL

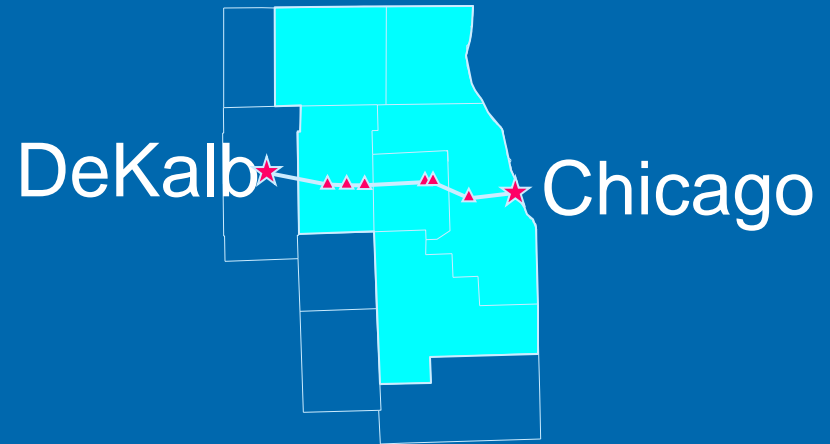
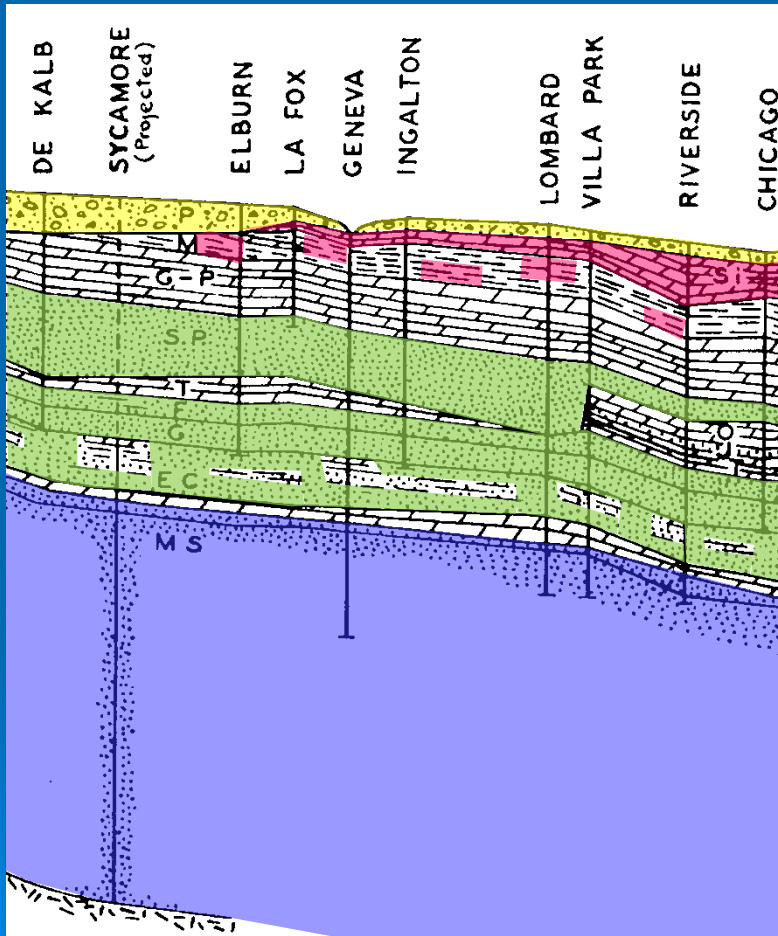
	2010	2040	Change in Growth	
Population	532,852	802,231	269,379	51%
Households	179,702	274,085	94,383	53%
Employment	224,546	368,494	143,947	64%

Source: Chicago Metropolitan Agency for Planning, 2010.

Aquifers of Northeastern Illinois

West

East



Unconsolidated Aquifer System



Shallow Bedrock Aquifer



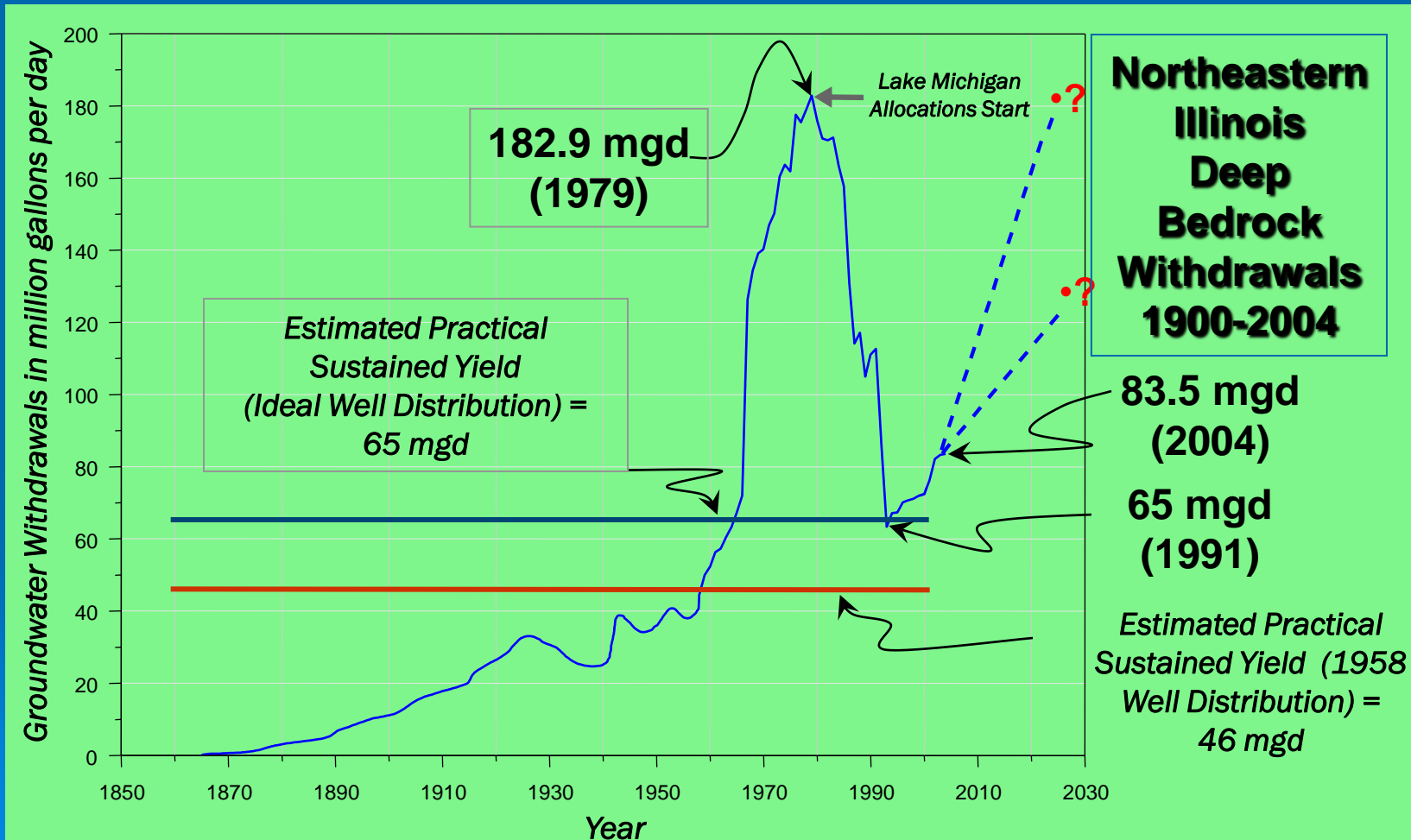
Deep Bedrock Aquifer System



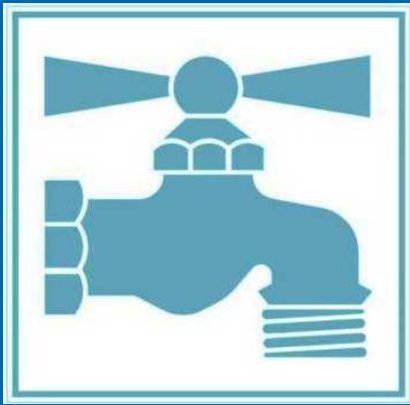
Elmhurst-Mt. Simon Aquifer

Cross-Section Modified from Bretz (1939)

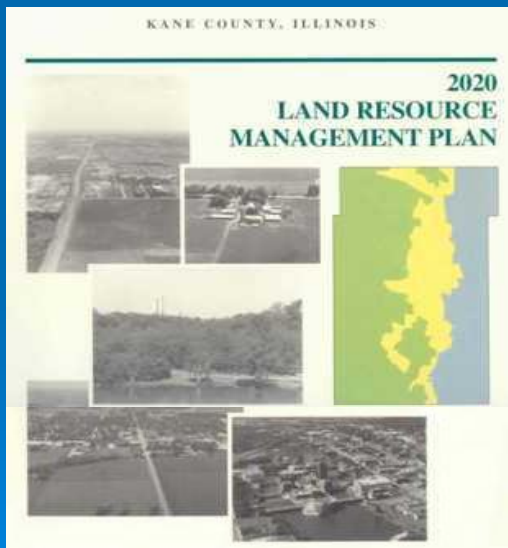
Northeastern Illinois Deep Bedrock Withdrawals 1900-2004



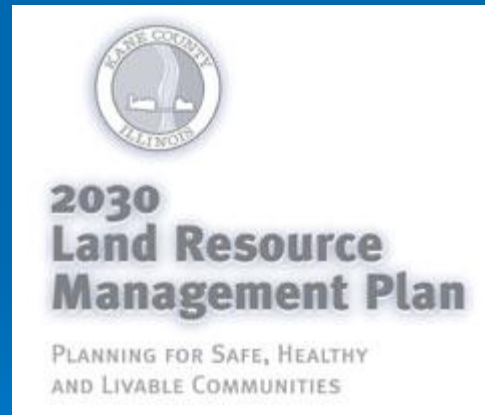
Water Supply Challenge:



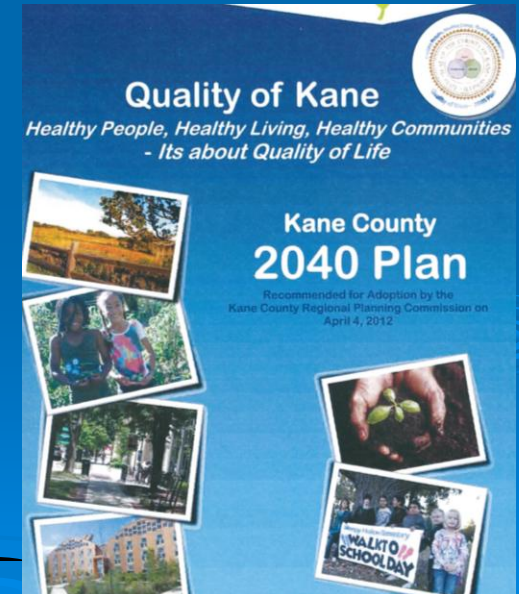
How will we provide an additional 50 to 60 million gallons per day of sustainable water supply for an additional 300,000 people by the year 2040 in the most efficient and environmentally responsible manner?



**Adopted
1996**



**Adopted
2004**



Adopted 2012

Kane County Water Resources Investigations by the ISWS/ISGS

Kane County spent to \$1.8 million from 2002 through 2009 on:

Geologic & Hydrogeologic Models:

- Deep Bedrock Aquifer
- Shallow Aquifer

Flow Accounting Model:

- Surface water from the Fox River

Exhibit A

Illinois State Water Survey

ILLINOIS DEPARTMENT OF NATURAL RESOURCES

SWS

Main Office • 2204 Griffith Drive • Champaign, IL 61820-7495 • Tel (217) 333-2210 • Fax (217) 333-6540
Peoria Office • P.O. Box 697 • Peoria, IL 61652-0697 • Tel (309) 671-3196 • Fax (309) 671-3106

RESEARCH PROPOSAL

SUBMITTED TO: Kane County Development Department
Geneva, Illinois

GRANTEE: Board of Trustees, University of Illinois
State Water Survey Division

SCIENTIFIC GROUP: IL State Water Survey
2204 Griffith Drive
Champaign, IL 61820

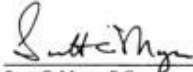
IL State Geological Survey
615 E. Peabody
Champaign, IL 61820


TITLE: Water-Resources Investigations for Kane County, Illinois

Amount Requested: \$1,818,578

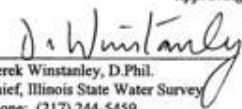
Proposed Duration: 5 years


Principal Investigators


Scott C. Meyer, P.G.
Illinois State Water Survey
Phone: (217) 333-5382

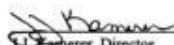

William S. Dey
Illinois State Geological Survey
Phone: (217) 244-2779

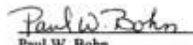
Approving Administrative Official


Derek Winstanley, D.Phil.
Chief, Illinois State Water Survey
Phone: (217) 244-5459


William W. Shultz
Chief, Illinois State Geological Survey
Phone: (217) 333-5111

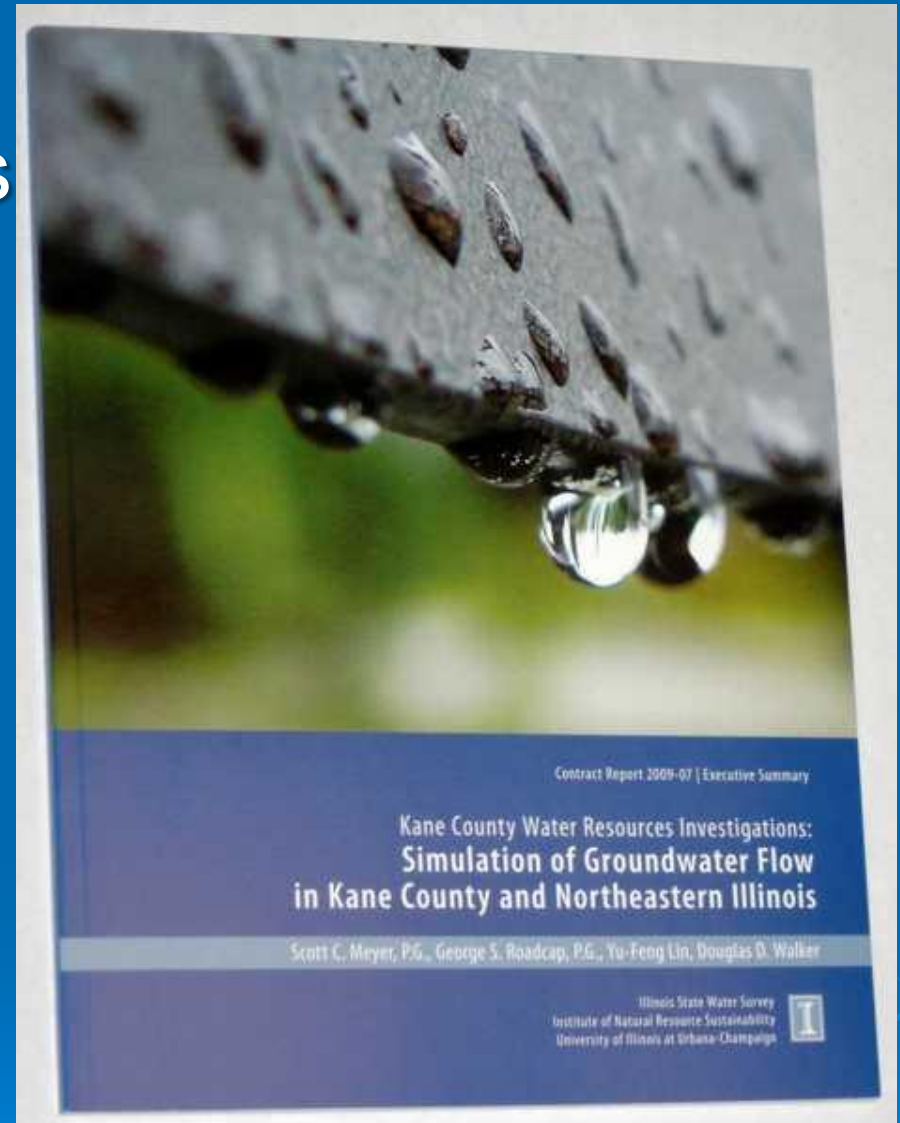
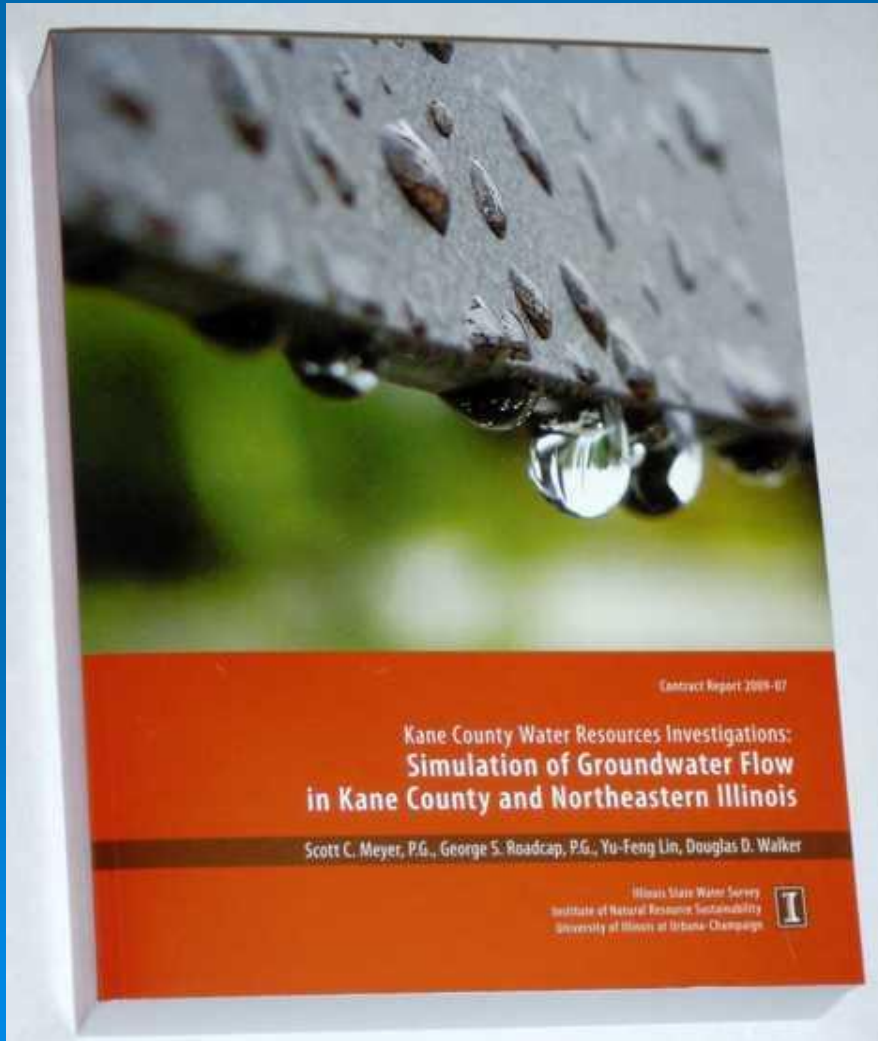
Approving University Officials


J. J. Kasher, Director
Grant & Contract Administration
University of Illinois
Phone: (217) 333-2187


Paul W. Bohn
Interim Chair, Research Board
University of Illinois
Phone: (217) 333-2187

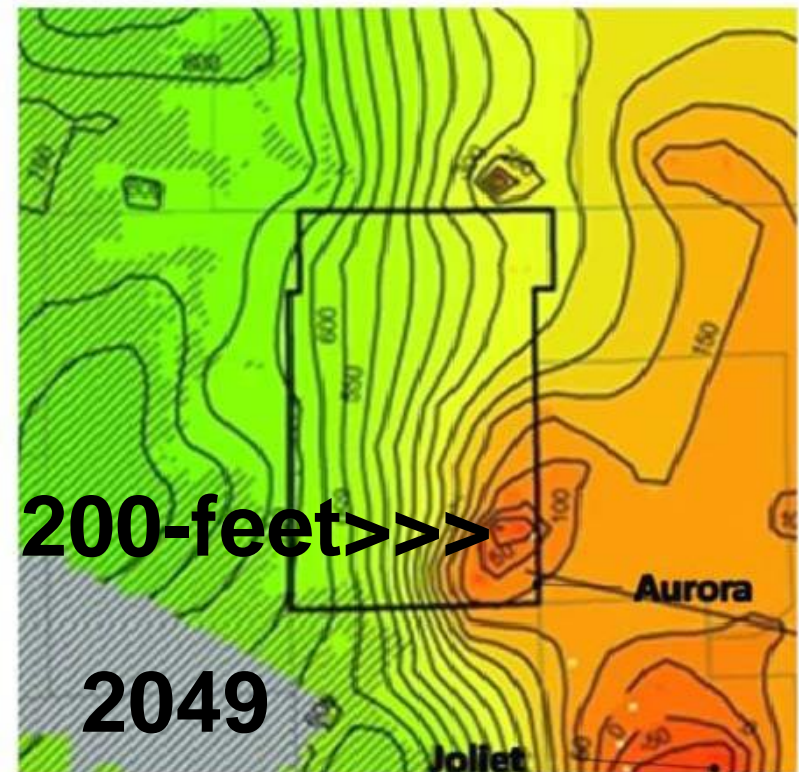
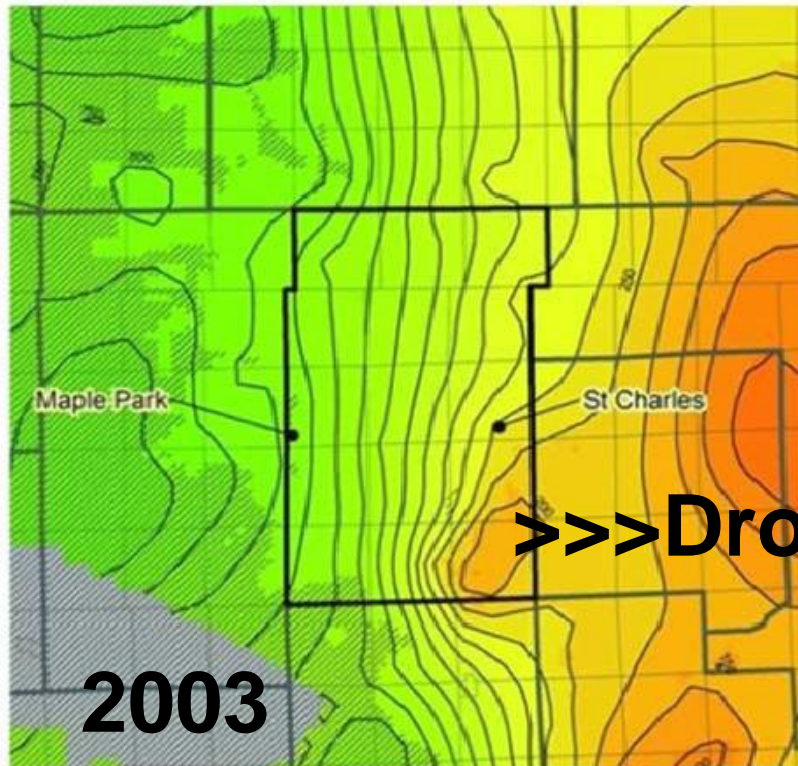
Printed on recycled paper

Kane County Water Resources Investigations 2002 - 2009

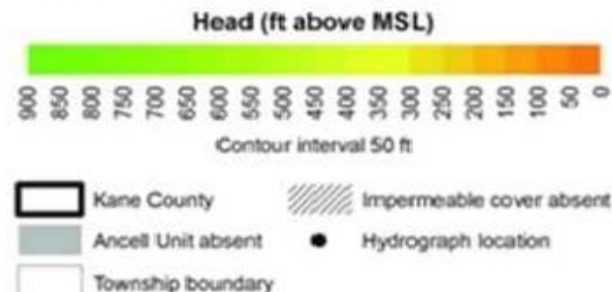


[http://www.isws.illinois.edu/
docs/pubs/ISWSCR2009-07/](http://www.isws.illinois.edu/docs/pubs/ISWSCR2009-07/)

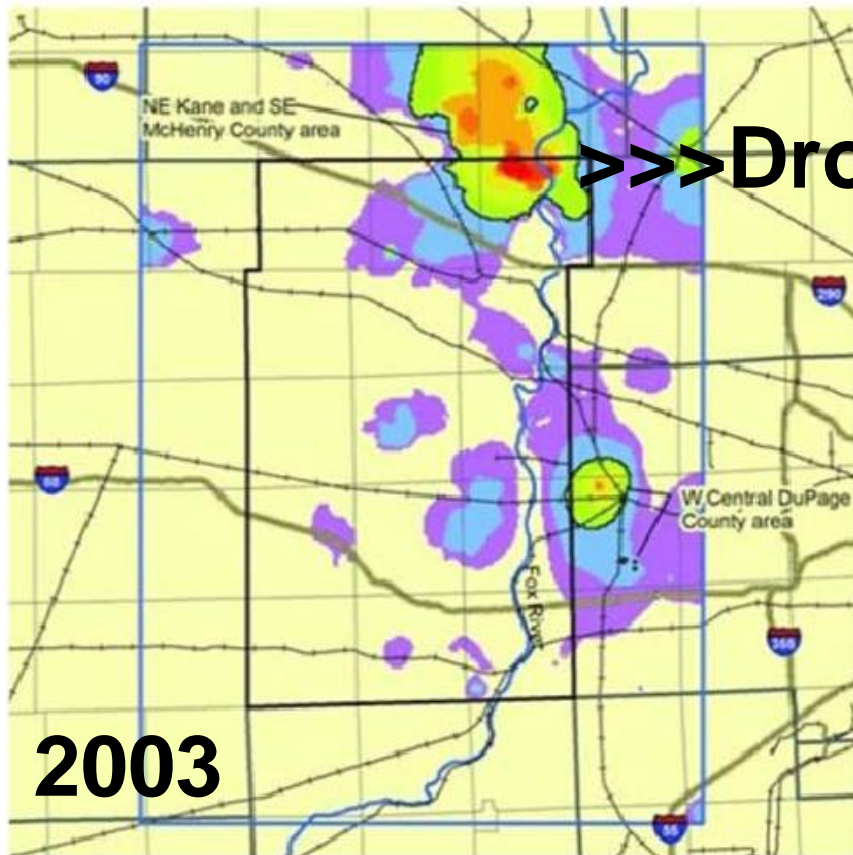
Simulated Water Levels in the Deep Aquifer Ansell Unit fro the Kane County ISWS Study



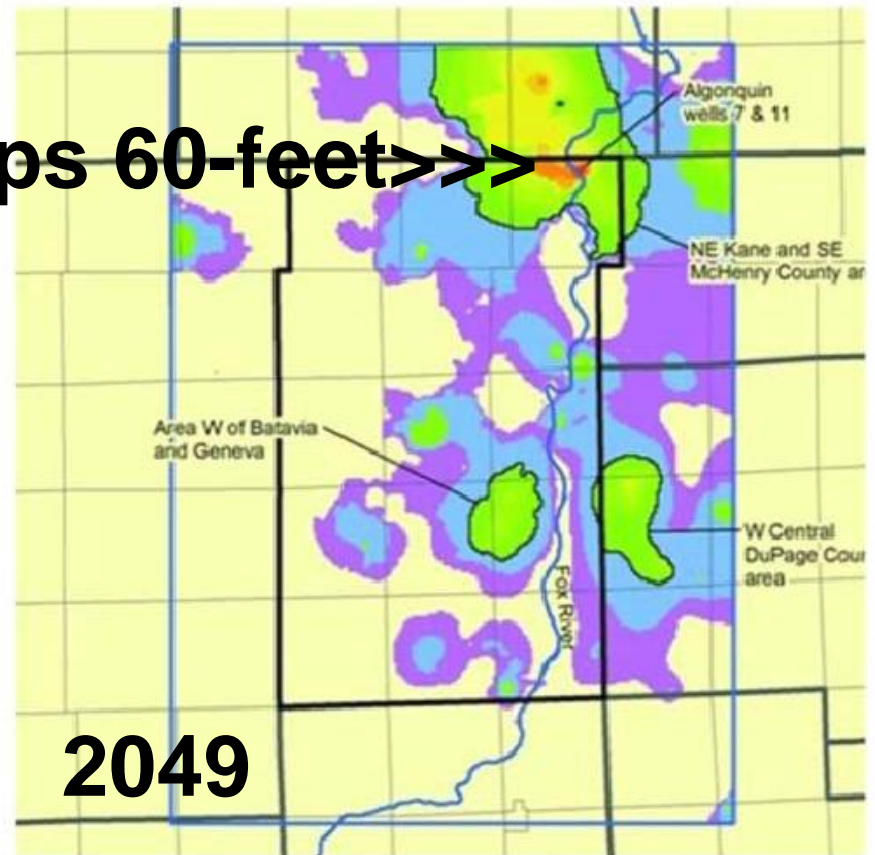
>>>Drops 200-feet>>>



Simulated Water Levels in the Shallow Bedrock Aquifer from the Kane County ISWS Study



Drawdown Since Predevelopment (ft)



Drawdown Since Predevelopment (ft)



>>> Drops 60-feet >>>

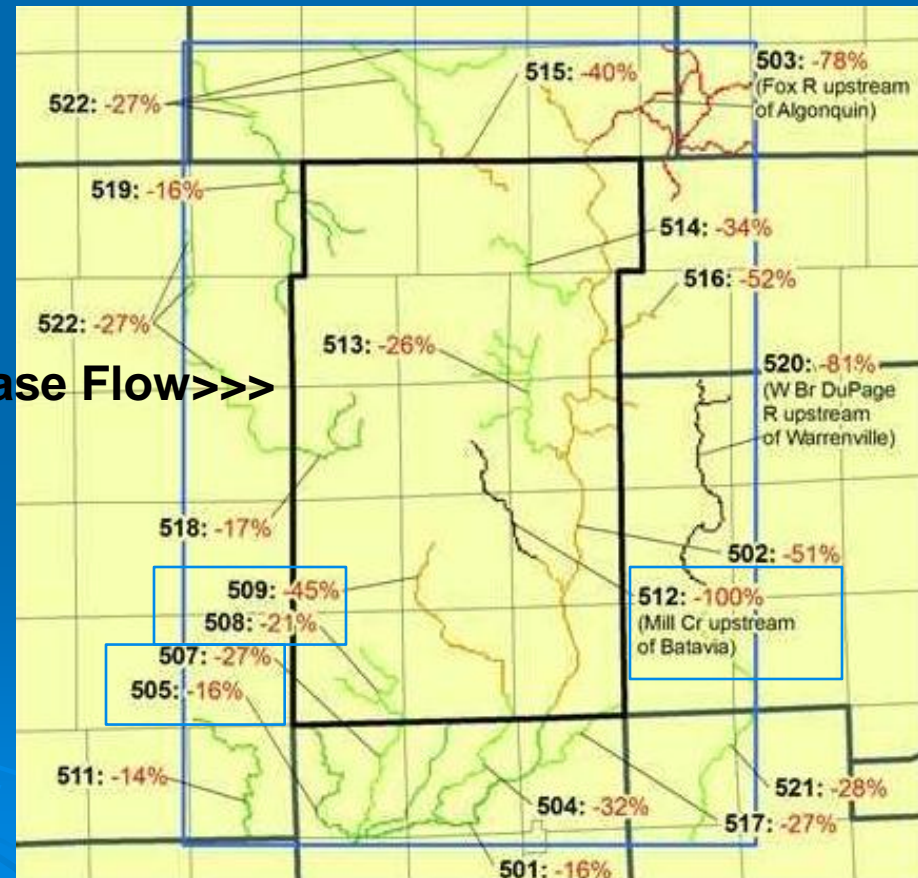
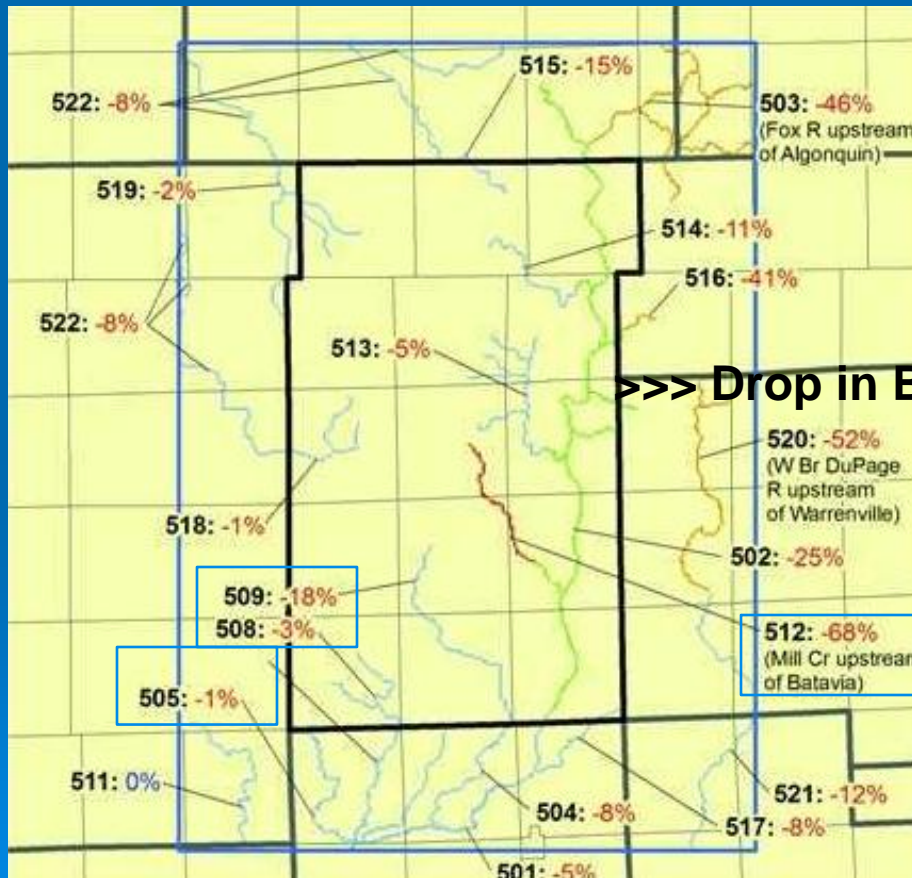
Change in Streamflow Discharge 2003 to 2049

Change in Natural Groundwater Discharge Since Predevelopment (%)



Key to labeling

Reach number **515: -23%**
 Change in natural groundwater discharge (red=decrease, blue=increase or no change)



KCChronicle.com • Friday, July 27, 2012

Dry conditions lead to bleak talk about water

It is the summer of drought. Water-starved cornstalks wilt in dirt-cracked fields. Geneva's ban on backyard open fire pits lowers the consumption of

During the last extended drought in the 1930s, Mike explained, "The world's population was about 2.1 billion. Today, it is seven billion-plus, not good odds



GUEST VIEW
Rick Holinger

tions. That will cost money. A growing investor pool sees water as the next big oil. "What it comes down to," Mike confessed, "is that everyone, myself included,

lize prices." On the local front, Mike questions why our communities continue to use highly purified drinking water to flush toilets, water lawns and

Drought intensifies locally, statewide

By JONATHAN BILYK
jbilyk@shawmedia.com

Kane County has not slipped into extreme drought – yet.

But according to the latest report from agencies tracking climate in the U.S., Kane and northeastern Illinois are just a few spots in

"This drought is two-pronged. Not only the dryness, but the heat is playing a big and important role. Even areas that have picked up rain are still suffering because of the heat."

Brian Fuchs

Climatologist, author for Drought Monitor

heat."

Fuchs said Drought Monitor expects "further development and intensification" of drought conditions "into the fall."

The drought conditions have exacted a heavy toll on corn production throughout Illinois. Local farmers have said they expect losses of 30



There will be another Drought!

Palmer Drought Severity Index - Illinois

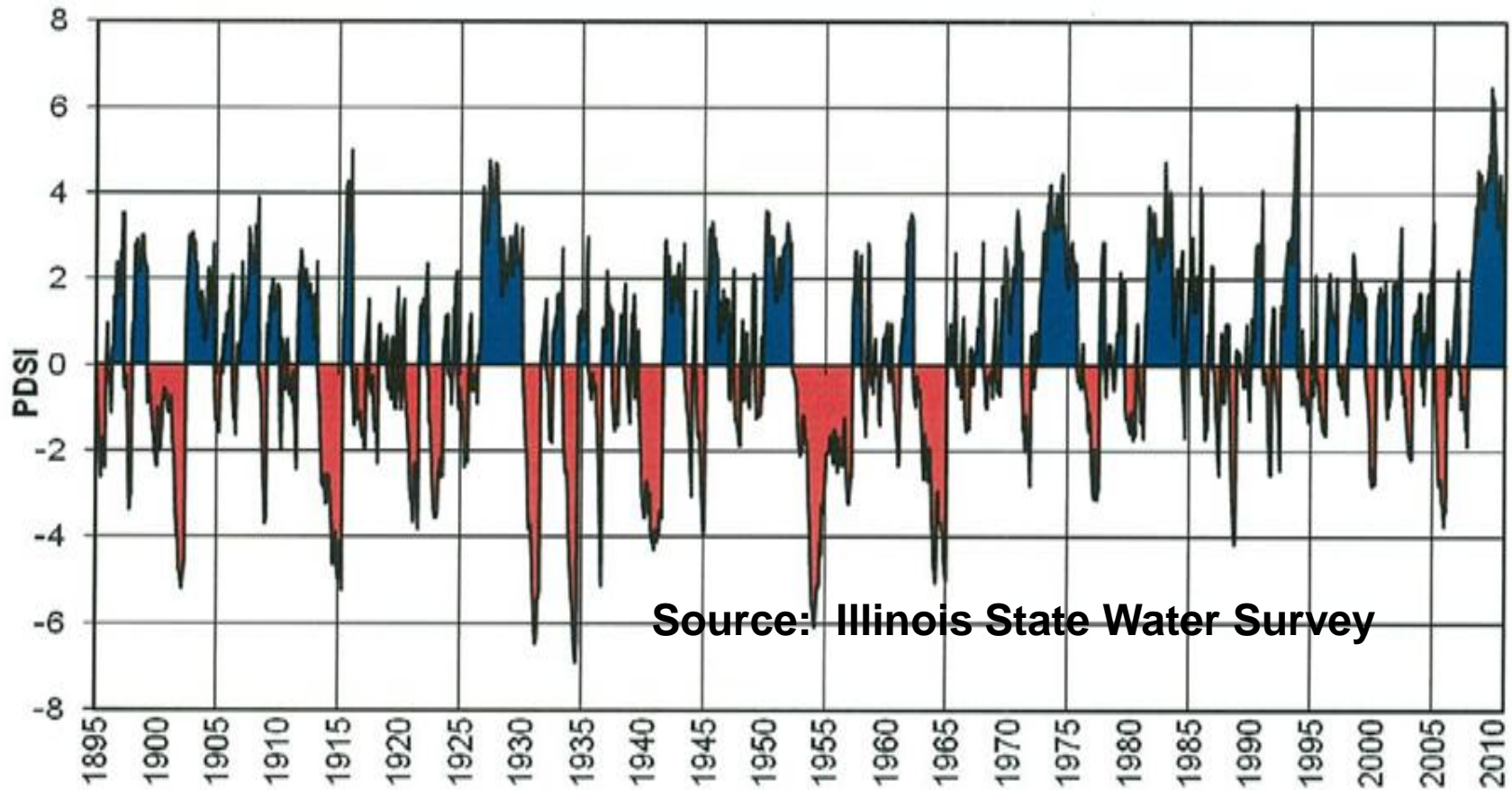
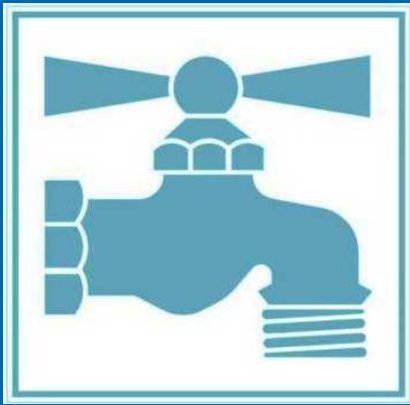
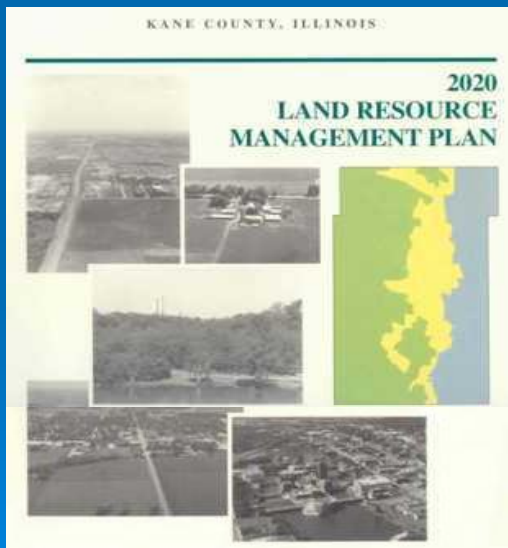


Figure 1. The Palmer Drought Severity Index (PDSI) from 1895 to present is shown with dry periods in red and wet periods in blue. Data provided by the National Climatic Data Center. Graph provided by the Illinois State Water Survey.

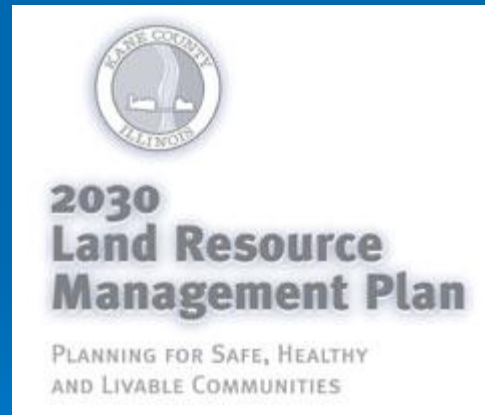
Water Supply Challenge:



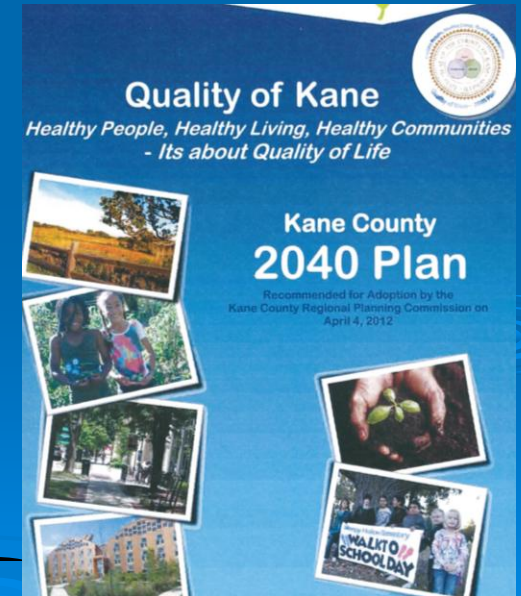
How will we provide an additional 50 to 60 million gallons per day of sustainable water supply for an additional 300,000 people by the year 2040 in the most efficient and environmentally responsible manner?



**Adopted
1996**



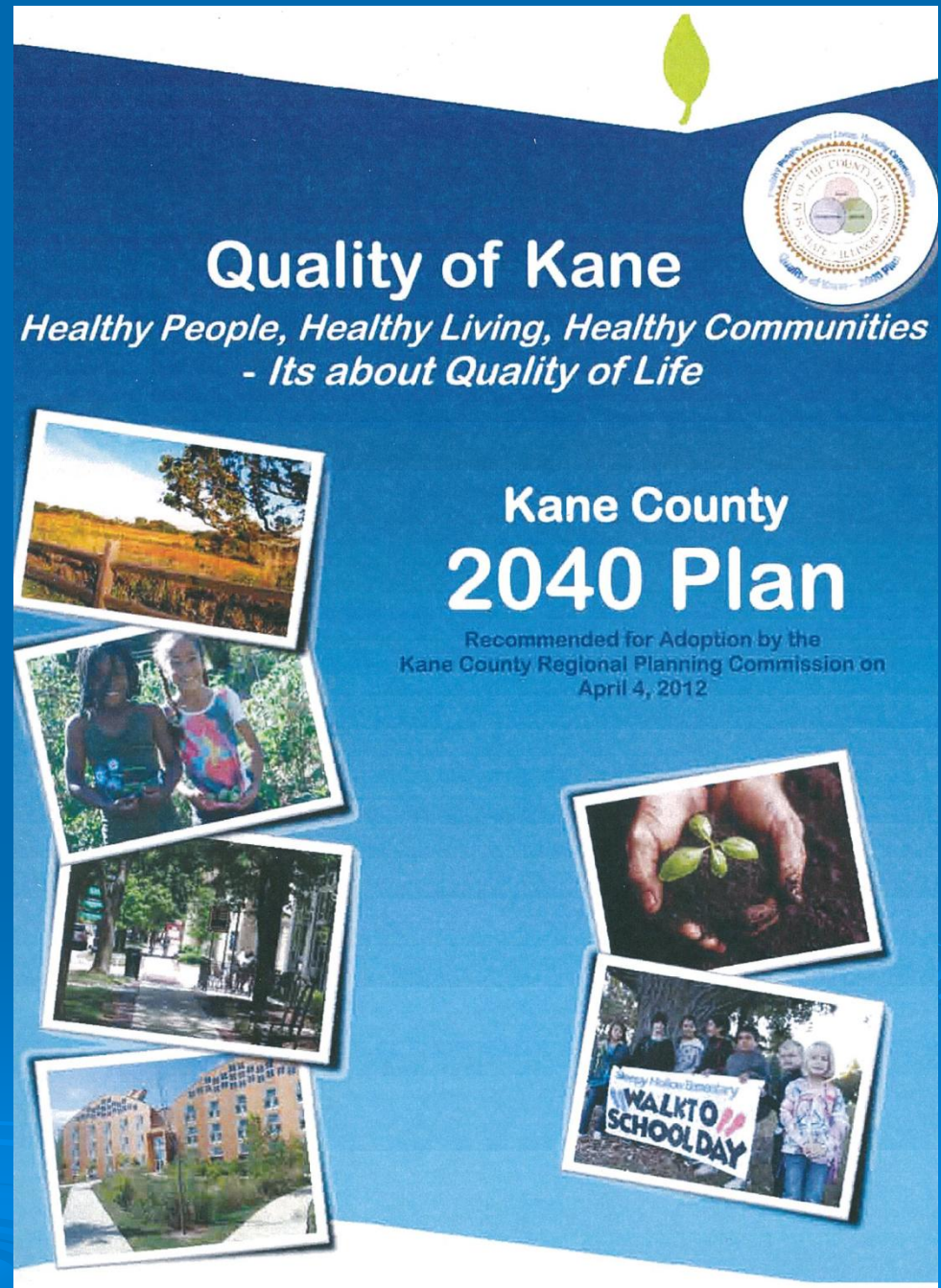
**Adopted
2004**




















Adopted 2012

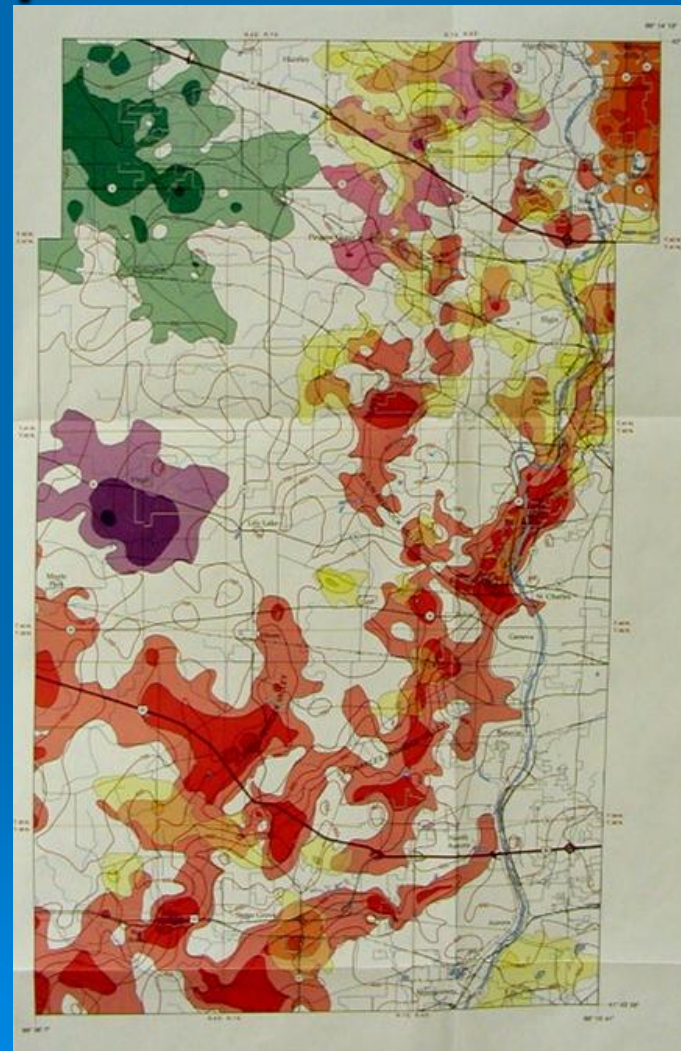
2040 Draft Plan Water Resources Objectives / Policies

- Preserve and protect the quality of groundwater and surface water, the primary sources of drinking water in Kane County, and encourage water conservation and efficiency programs.
- To promote water conservation and efficiency, the reuse of gray water and the recycling of reclaimed water to reduce water demands and conserve energy.
- To promote drought management planning and the monitoring of aquifer levels and stream flows for decision making in the event of a drought.



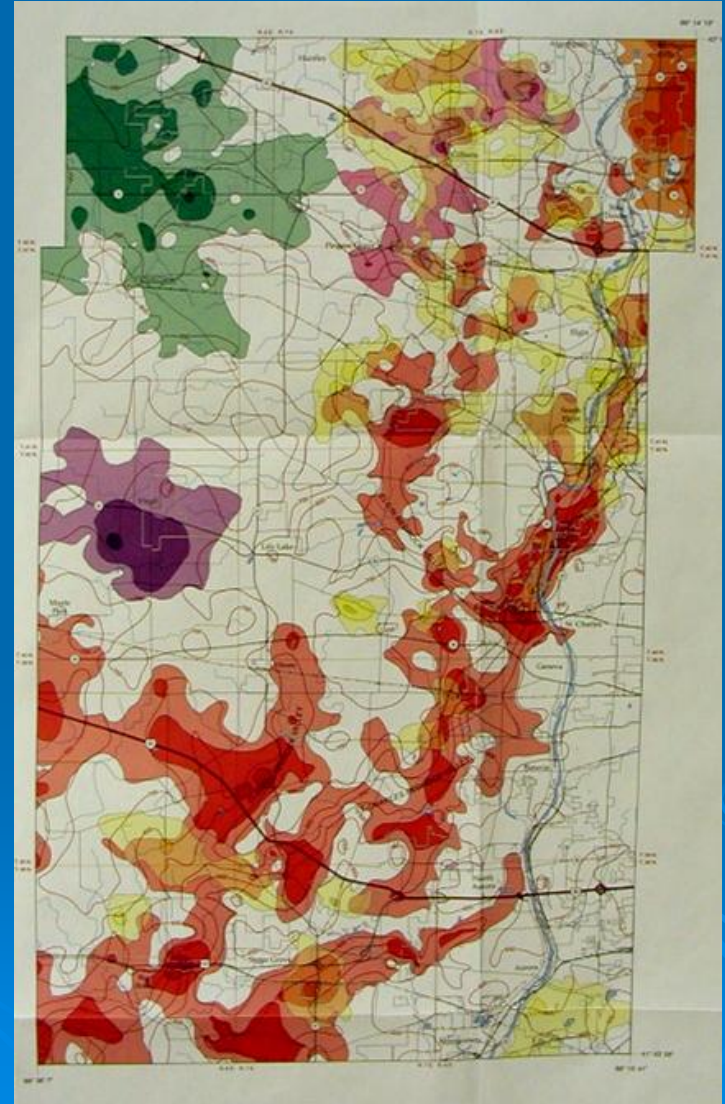
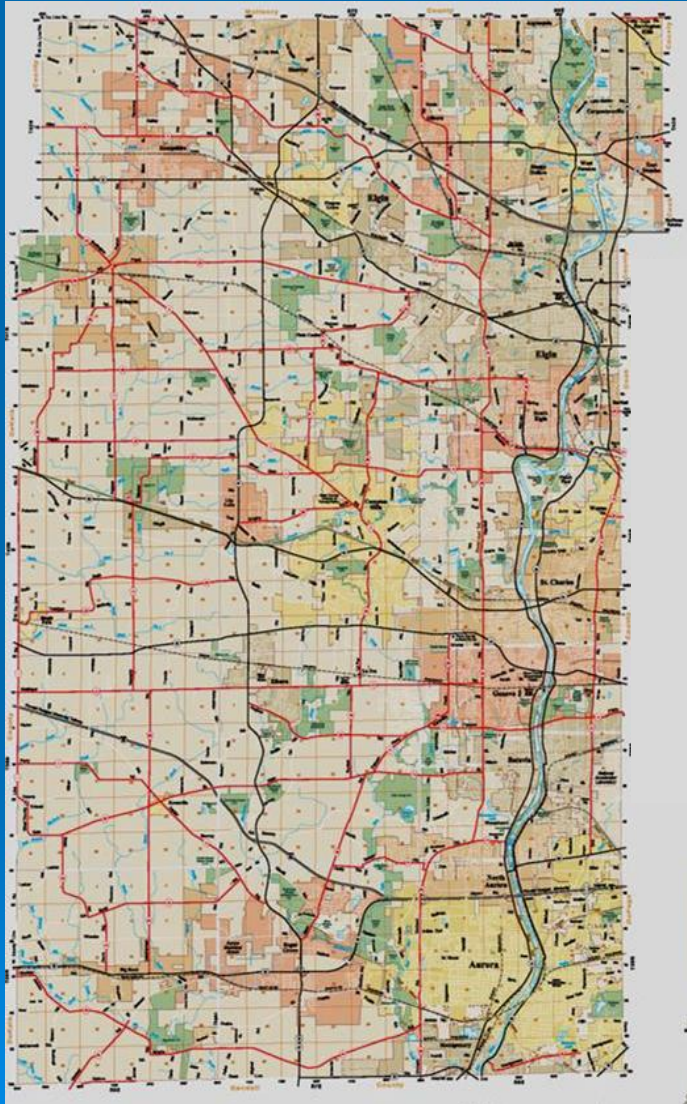
Major High Capacity Shallow Aquifers*

Major Quaternary Aquifers	
	Carpentersville > 100
	50 - 100
	20 - 50
	Gilberts -- 50-100
	20 - 50
	Hampshire > 100
	50 - 100
	20 - 50
	St. Charles > 100
	50 - 100
	20 - 50
	Unnamed > 100
	50 - 100
	20 - 50
	Virgil > 100
	50 - 100
	20 - 50



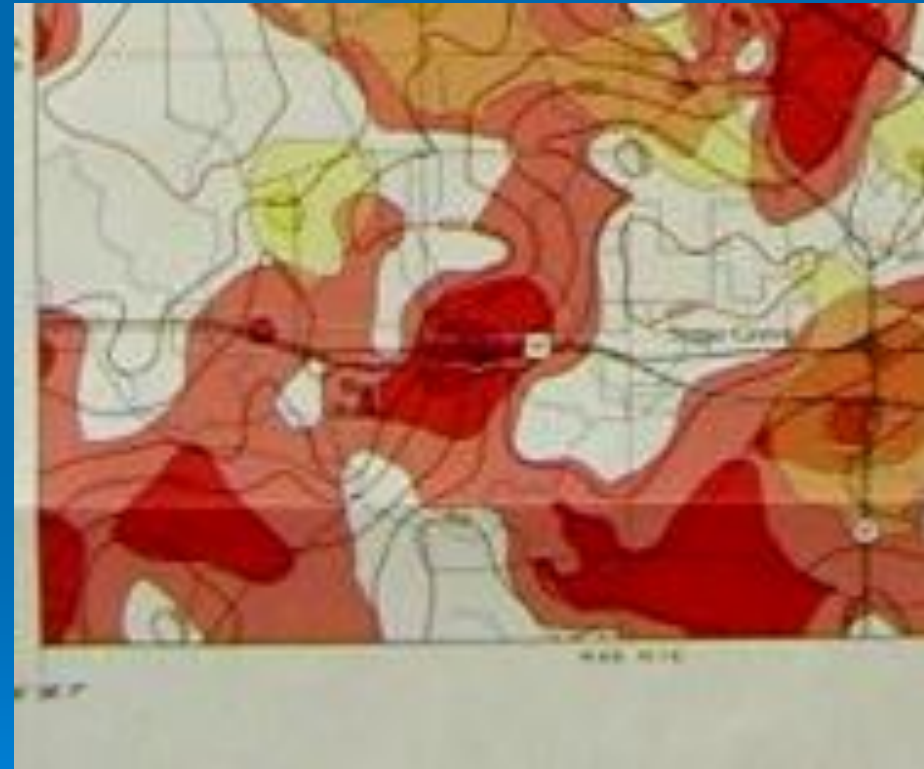
* Wells capable of supplying greater than 100,000 gallons per day

Municipal Boundaries do not Coincide with High Capacity Shallow Aquifers*

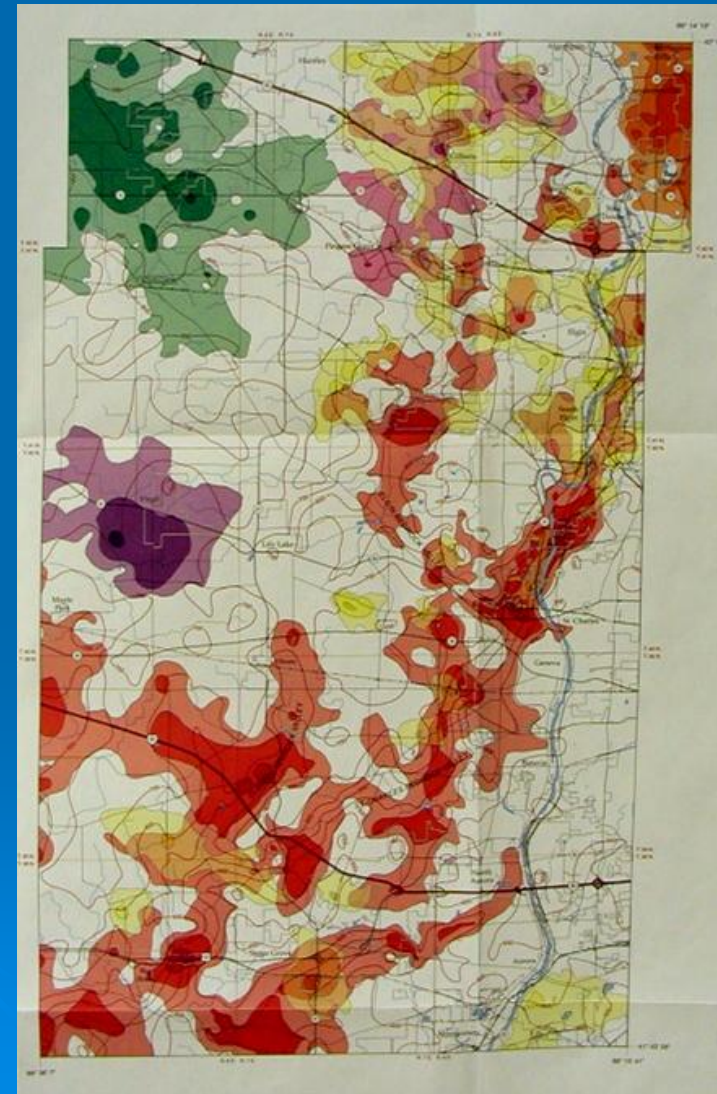
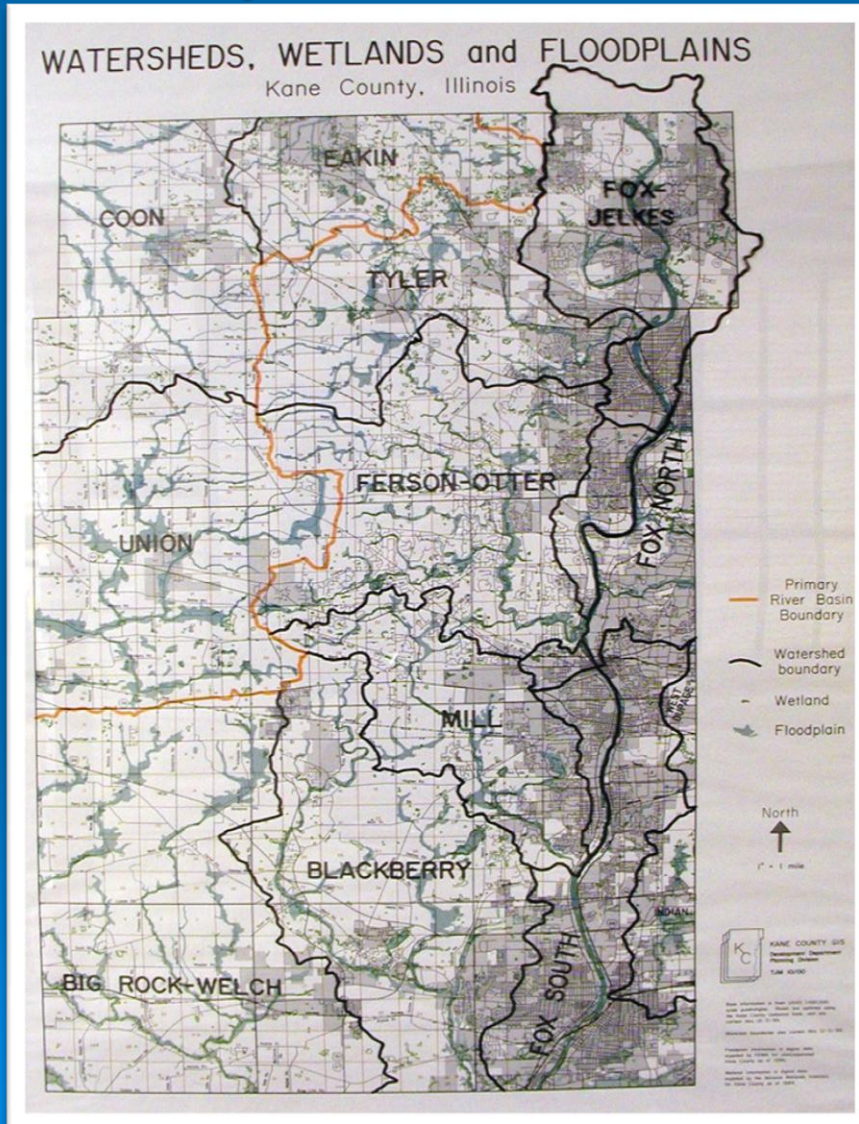


* Wells capable of supplying greater than 100,000 gallons per day

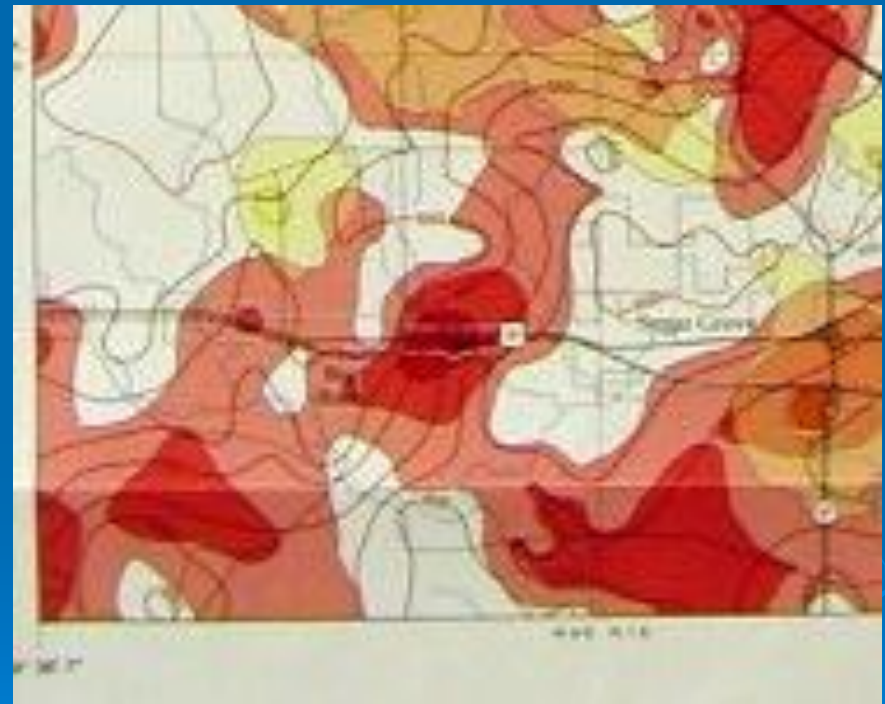
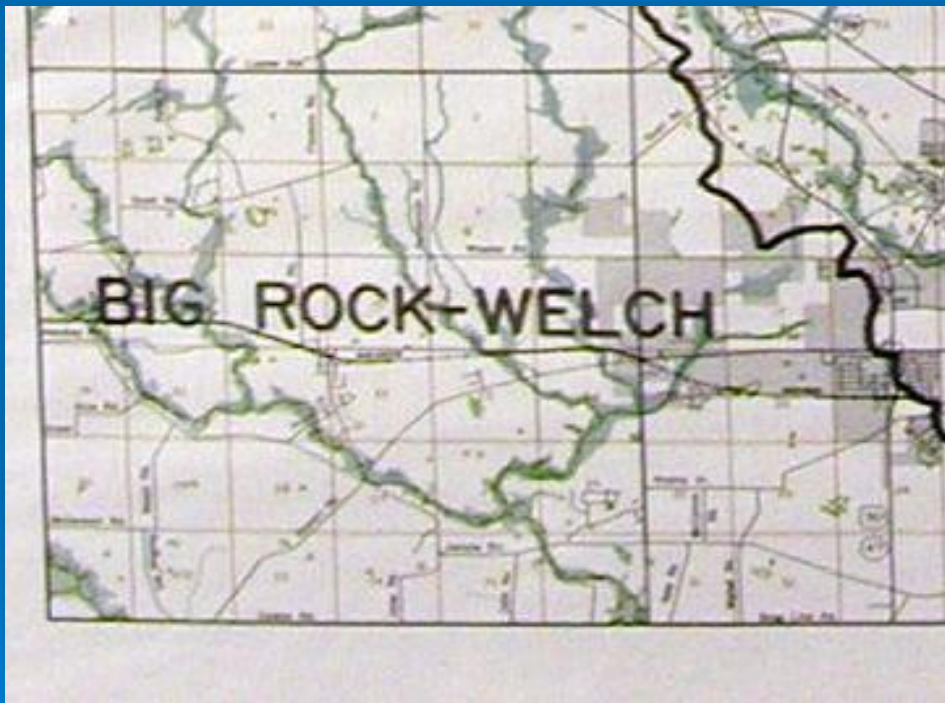
Municipal Boundaries do not Coincide with High Capacity Shallow Aquifers*
















Surface Watersheds do not Coincide with Aquifers or Buried Bedrock Surface



Surface Watersheds do not Coincide with Aquifers or Buried Bedrock Surface
















Aquifer Sensitivity to Contamination

Aquifer Sensitivity to Contamination	
	High Potential -- A1
	A2
	A3
	A4
	Moderately High -- B1
	B2
	Moderate Potential -- C1
	C2
	C3
	Moderately Low -- D1
	D2
	D3
	Low Potential -- E



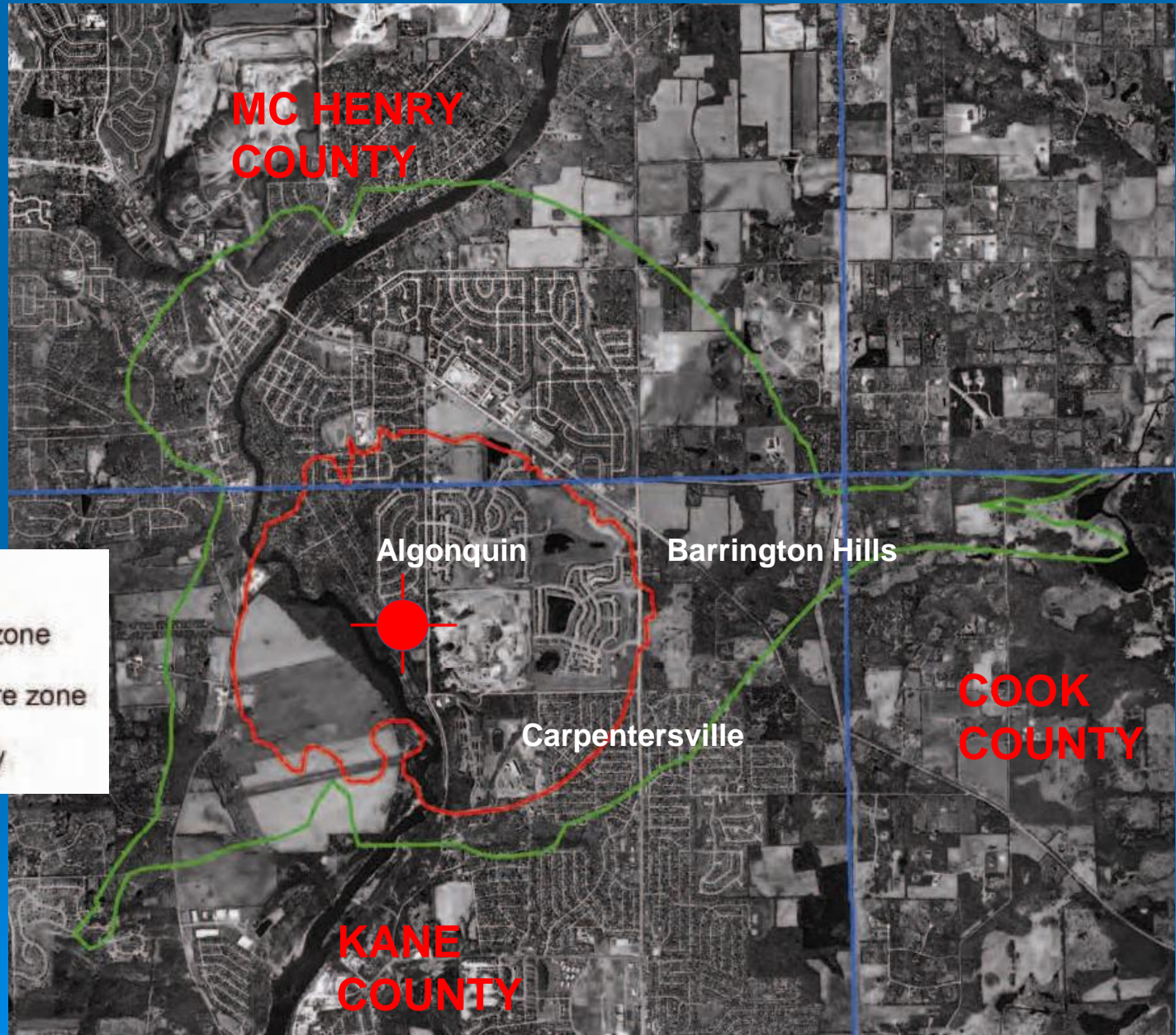
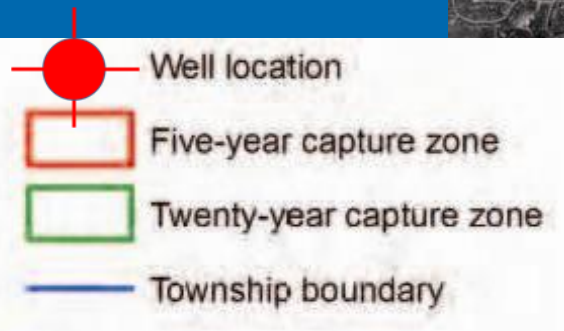
Aquifer Sensitivity to Contamination



Aquifer Sensitivity to Contamination	
	High Potential -- A1
	A2
	A3
	A4
	Moderately High -- B1
	B2
	Moderate Potential -- C1
	C2
	C3
	Moderately Low -- D1
	D2
	D3
	Low Potential -- E

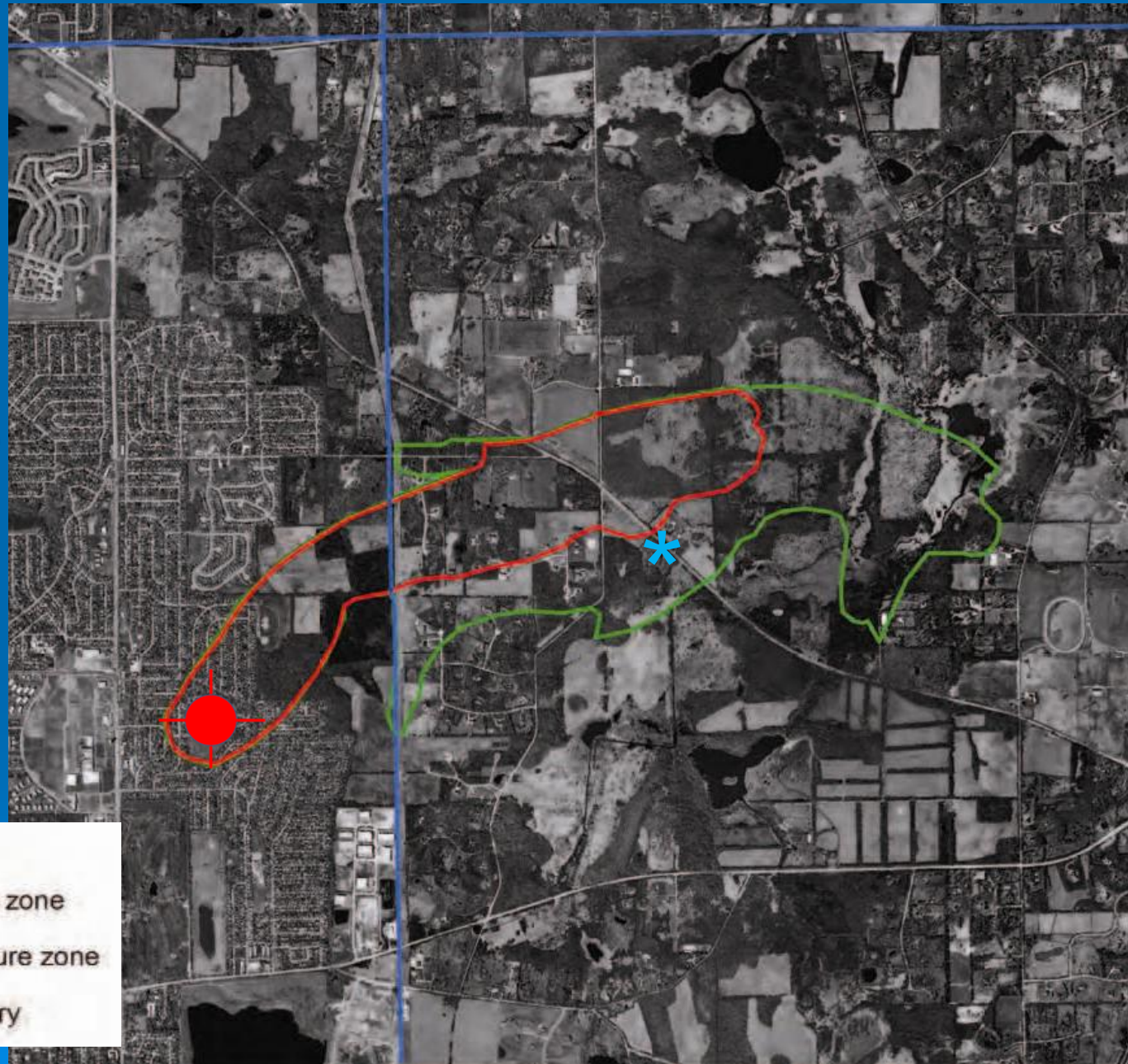
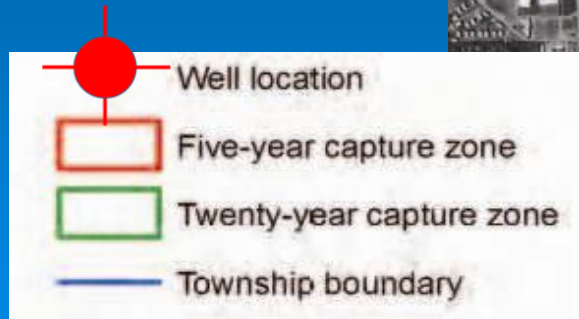
Capture Zones

Algonquin Wells 7 & 11







Capture Zones

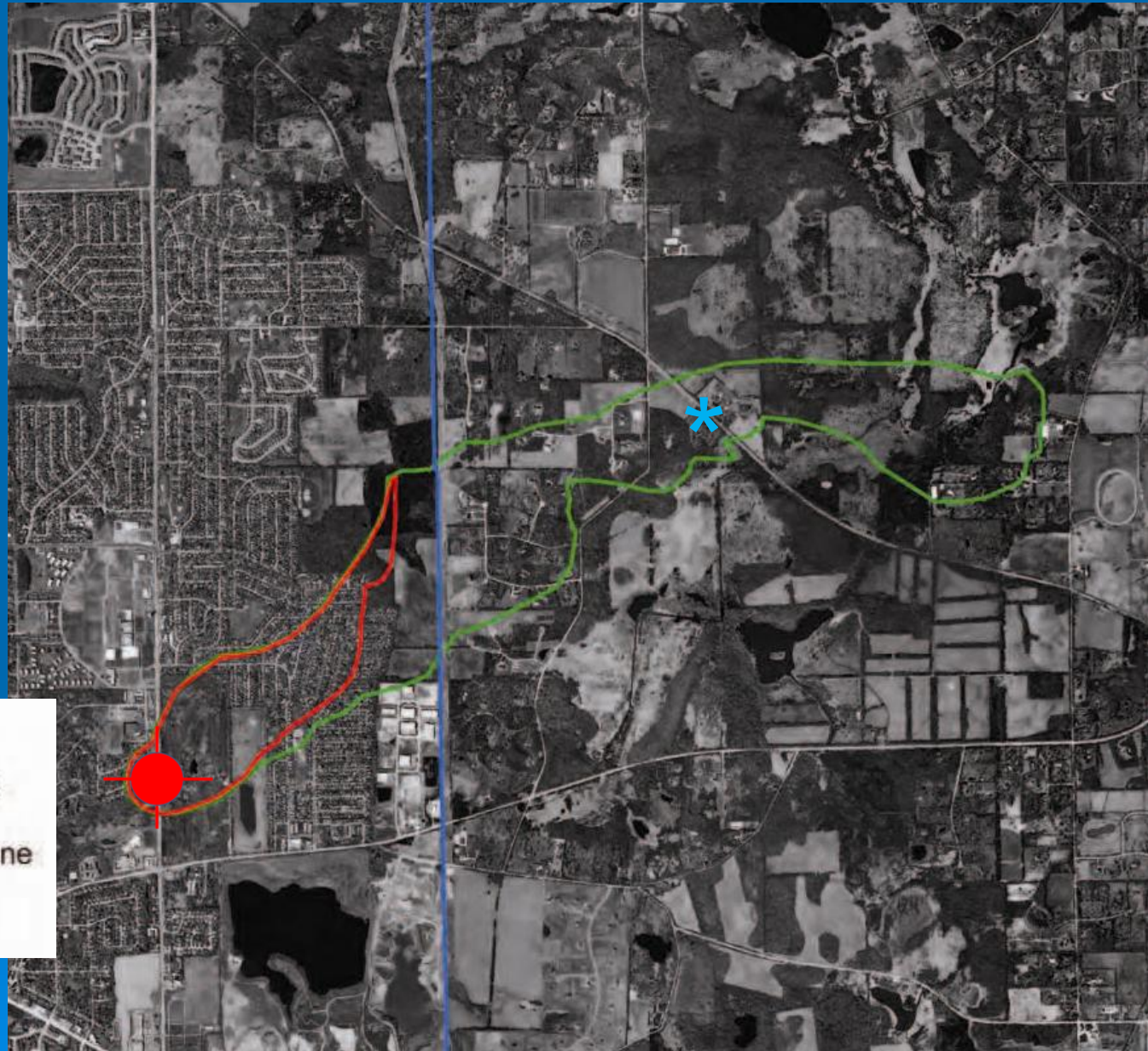
Carpentersville Well #7



Capture Zones

East Dundee Well #4

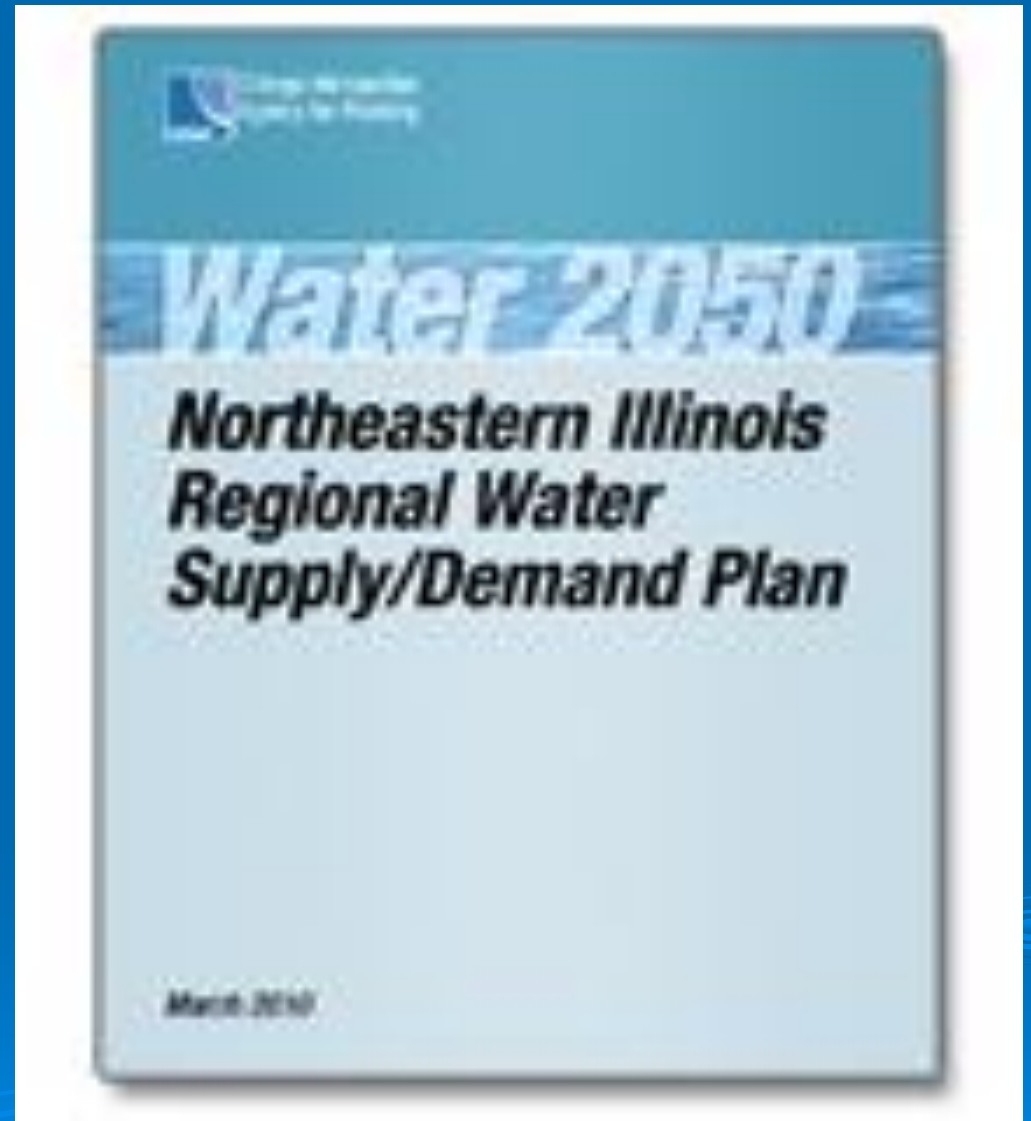
-  Well location
-  Five-year capture zone
-  Twenty-year capture zone
-  Township boundary



Chicago
Metropolitan
Agency for
Planning

Water 2050
Regional
Water Supply/
Demand Plan

March 2010

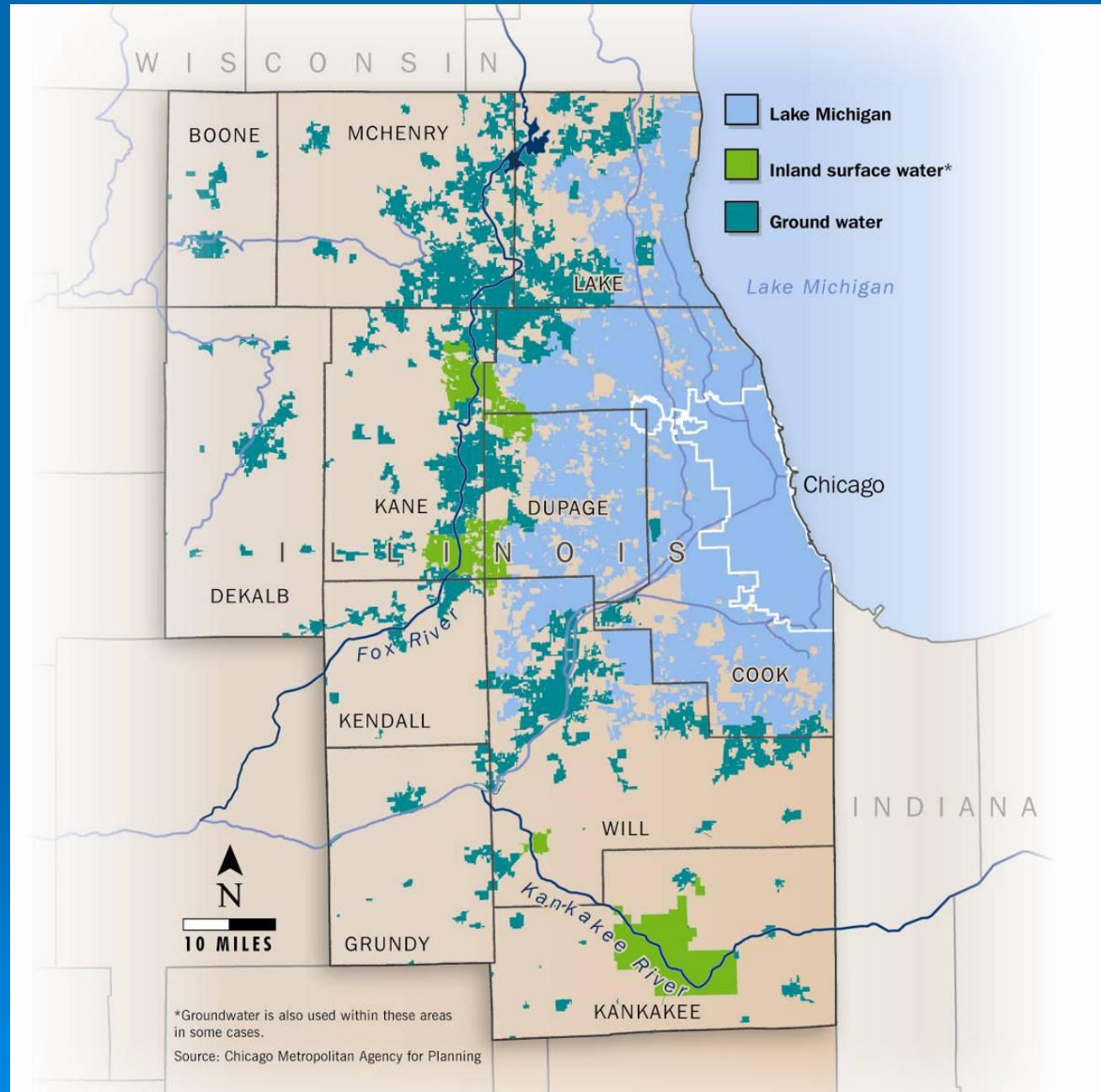


<http://www.cmap.illinois.gov/regional-water-supply-planning>

Sources of Public Water Supply in Northeastern Illinois

Outer collar counties will remain dependant on groundwater and surface water supplies.

*Elgin and Aurora use groundwater as well as surface water” - CMAP



Northwest Water Planning Alliance

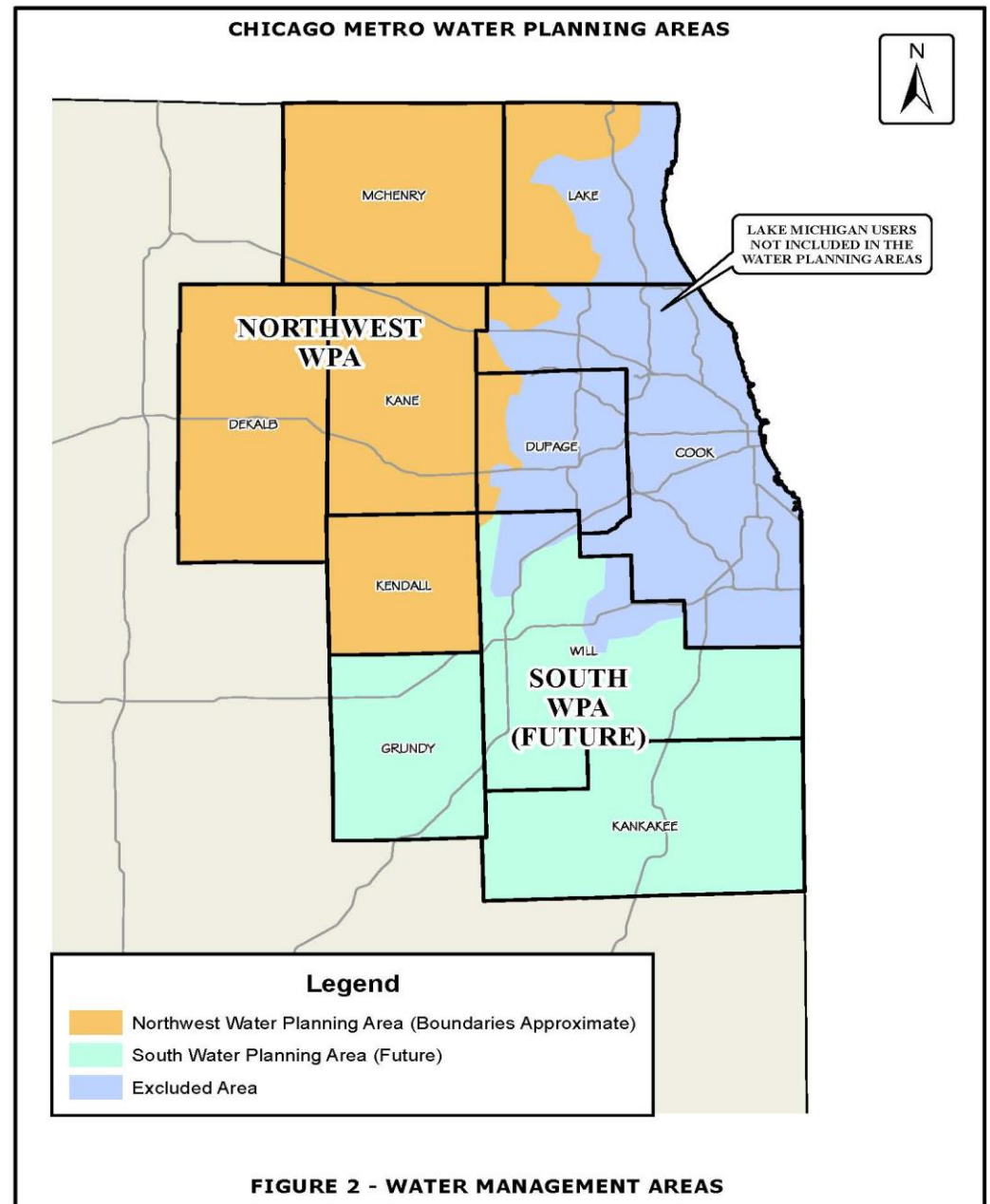
September 2010

5 Counties

Lake
McHenry
Kane
DeKalb
Kendall

5 Councils of

Government
with Municipalities



NWPA Highlights

(1 of 2)

- 5 COGs
- 5 NW Counties
- Voluntary Basis
- Consistent Standards & Reporting Programs similar to Lake Michigan Users
- Develop Policies/Plans that Support the NE IL Regional Water Supply/Demand Plan

NWPA Highlights

(2 of 2)

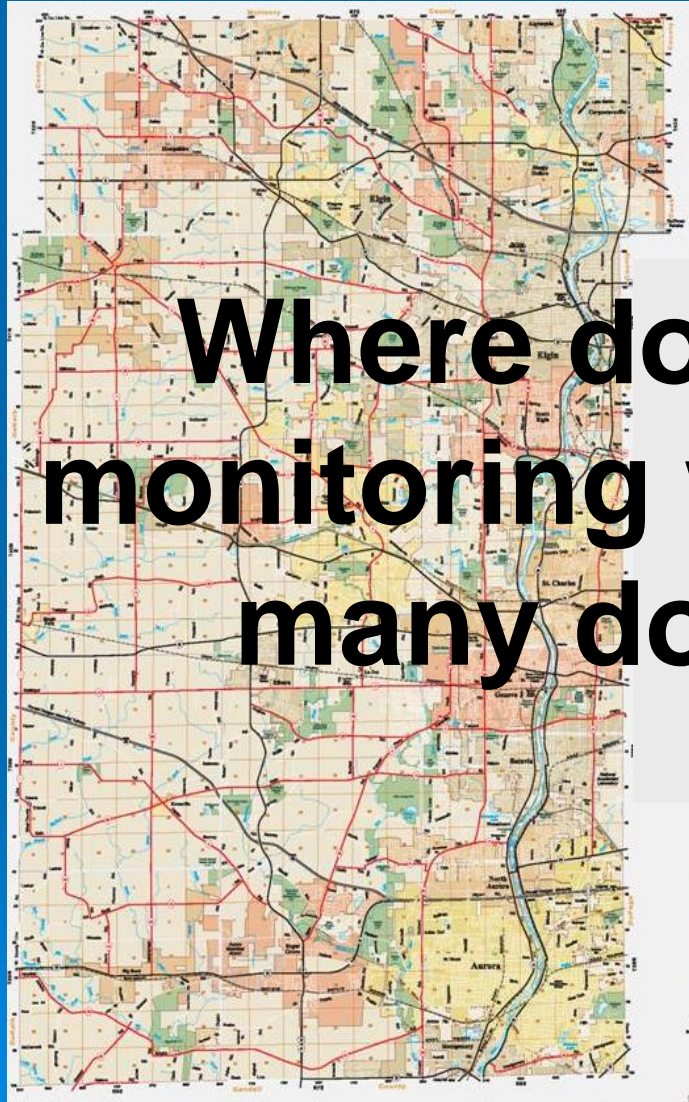
- Executive Committee made up of Elected COG and County Officials
- Appointed a Technical Advisory Committee
- Immediate Goals
 - Model Lawn Watering Ordinance
 - Water Sense Partnerships all members
 - Drought Preparedness Planning

Northwest Water Planning Alliance

Why a Lawn Watering Conservation Ordinance?

- Deep aquifer withdrawals are exceeding recharge
- Drought has sharp impacts on shallow aquifers and Fox River
- Lawn watering is a major discretionary use of potable water, and a highly visible one
- **Inconsistency between NWPA members on lawn watering policies today and our water resources are often shared!**

Kane County's 30 Municipalities and Shallow Aquifers



Where do we site the monitoring wells and how many do we need?




Purposes of a Groundwater Monitoring Network

- Needs of our existing groundwater model for more data for further analyses
- Avoiding well interference with new wells
- Drought Preparedness and management
- Revision of pumping forecasts with better data
- Further calibration of the groundwater model
- Rationalize the use of the existing sources of water
- Evaluate the economics of using existing water supplies versus developing new ones

Approach to Developing a Groundwater Monitoring Network

- Work with the ISWS to identify the needs of the Kane County groundwater model and to suggest ideal locations of static level measuring wells
- Work with the USGS to develop a plan of real time and data logging water level gauges
- Evaluate the locations of existing wells for gauges and determine the gaps in the ideal network
- Determine the costs and phases to implement the network
- Develop funding sources with other stakeholders, including municipalities and grant resources

Summary of Future Work

- Surface water and groundwater models can be used for further analysis.
 - Models can be improved with new observations , revision of pumping forecasts, and adaptation to continually improving modeling.
 - Monitoring is key.
- 

Thank you!

Paul M. Schuch, P.E., CFM
Kane County
Director Water Resources
schuchpaul@co.kane.il.us
www.co.kane.il.us



